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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/072,443	02/05/2002	Yong-Kil Kim	5484-87	2611

7590 07/02/2004

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EXAMINER

ZERVIGON, RUDY

ART UNIT	PAPER NUMBER
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1763

DATE MAILED: 07/02/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/072,443	KIM, YONG-KIL	
	Examiner	Art Unit	
	Rudy Zervigon	1763	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 May 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-15 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-15 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on April 12, 2004 and May 20, 2004 have been entered.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. Claims 1-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tracy et al (USPat. 4,612,077) in view of Umotoy, Salvador P. et al (US 6,302,964 B1). Tracy teaches a gas (22; Figure 1) distribution apparatus (Figure 2,3; column 2, lines 55 - column 3, line 9) for supplying gas (22; Figure 1) into a semiconductor wafer processing chamber (16; Figure 1), the apparatus comprising:
- i. a body (20; Figure 3; column 2, lines 55 - column 3, line 9) having a bottom wall and a plurality of gas (22; Figure 1) inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26) extending through the bottom wall; and an injection plate (12; Figure 3; column 2, lines 55-62), attached by being screwed to the bottom surface of the body's (20; Figure 3; column 2, lines 55 - column 3, line 9) bottom wall, the injection plate (12; Figure 3; column 2, lines 55-

- 62) having grooves (68, 70, 72; Figure 3; column 3, lines 20-30) on an upper surface of the injection plate that connect the gas (22; Figure 1) inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26), the injection plate also having injection holes (34, 36, 38; Figure 2, 3; column 3, lines 5-10) that perforate the injection plate at predetermined intervals (radial distances of 28, 30, 32, and 27; Figures 2,3) throughout the grooves, - claim 1
- ii. The apparatus, as defined in claim 1, wherein the gas (22; Figure 1) inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26) are formed at different distances from a center of the bottom wall, as claimed by claim 2
- iii. The apparatus, as defined in claim 1, wherein the body (20; Figure 3; column 2, lines 55 - column 3, line 9) additionally comprises one gas inlet extension (40; Figure 3) that is integral to the bottom wall such that the gas inlet protrudes upwardly from the bottom wall, as amended by claim 3
- iv. The apparatus, as defined in claim 1, wherein an external periphery of an upper portion of the body (20; Figure 3; column 2, lines 55 - column 3, line 9) is fastened to the chamber, as claimed by claim 4 – Figure 1 shows coolant pipes 20 and gas pipe (40; Figure 3) fixed both to the body and the chamber 16.
- v. The apparatus, as defined in claim 1, wherein the grooves (68, 70, 72; Figure 3; column 3, lines 20-30) include a ring-shaped groove (72; Figure 3; column 3, lines 20-30) with a large diameter and a ring-shaped groove (68; Figure 3; column 3, lines 20-30) with a small diameter, as claimed by claim 5

- vi. The apparatus, as defined in claim 1, wherein the injection plate (12; Figure 3; column 2, lines 55-62) is attached to the bottom wall with a plurality of screws (26; Figure 2, 3), as claimed by claim 6
- vii. A gas (22; Figure 1) distribution apparatus (Figure 2,3; column 2, lines 55 - column 3, line 9) of semiconductor equipment to supply gas (22; Figure 1) into a chamber for a plasma etching process (Title), the apparatus comprising: a body (20; Figure 3; column 2, lines 55 - column 3, line 9) having a plurality of gas (22; Figure 1) inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26) and a cooling (24; Figure 1, 3) path configured to circulate coolant (column 2, lines 55-62) inside the body; and an injection plate (12; Figure 3; column 2, lines 55-62) attached to a bottom surface of the body (20; Figure 3; column 2, lines 55 - column 3, line 9), the injection plate (12; Figure 3; column 2, lines 55-62) having an upper interior surface with grooves (68, 70, 72; Figure 3; column 3, lines 20-30) that connect the gas (22; Figure 1) inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26), the injection plate also having injection holes (34, 36, 38; Figure 2, 3; column 3, lines 5-10) that perforate the injection plate formed at a predetermined intervals (radial distances of 28, 30, 32, and 27; Figures 2,3) inside the grooves, as claimed by claim 7 – That Tracy does not teach that his coolant is water is not an apparatus limitation. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the

claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

- viii. The apparatus, as defined in claim 7, wherein the gas (22; Figure 1) inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26) are formed at different distances from the center of a bottom part of the body (20; Figure 3; column 2, lines 55 - column 3, line 9), as claimed by claim 8
- ix. The apparatus, as defined in claim 7, wherein the body additionally comprises a gas inlet extension (40; Figure 3) that is integral to the body such that the gas (22; Figure 1) inlet (40) protrude upward from the body (20; Figure 3; column 2, lines 55 - column 3, line 9), as claimed by claim 9
- x. The apparatus, as defined in claim 7, wherein an external periphery of an upper portion of the body (20; Figure 3; column 2, lines 55 - column 3, line 9) is fastened to the chamber, as claimed by claim 10 – Figure 1 shows coolant pipes 20 and gas pipe (40; Figure 3) fixed both to the body and the chamber 16
- xi. The apparatus, as defined in claim 7, wherein the grooves include ring-shaped groove (72; Figure 3; column 3, lines 20-30) with a large diameter and a ring-shaped groove (68; Figure 3; column 3, lines 20-30) with a small diameter, as claimed by claim 11
- xii. The apparatus, as defined in claim 7, wherein the injection plate (12; Figure 3; column 2, lines 55-62) is attached to the bottom surface with a plurality of screws (26; Figure 2, 3), as claimed by claim 12
- xiii. The apparatus, as defined in claim 7, wherein the cooling (24; Figure 1, 3) coolant path includes an injecting hole (24/20 interface) and a discharging hole (not labeled; Figure 1, 3) as

claimed by claim 13 – That Tracy does not teach that his coolant is water is not an apparatus limitation. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

Tracy does not teach that his body (20; Figure 3; column 2, lines 55 - column 3, line 9) has a bottom wall and a plurality of gas (22; Figure 1) inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26) that perforate the bottom wall. Further Tracy does not teach that his injection plate (12; Figure 3; column 2, lines 55-62) is integral as required by amended claim 1, and that the injection plate (12; Figure 3; column 2, lines 55-62) has an upper exterior surface with grooves (68, 70, 72; Figure 3; column 3, lines 20-30). Tracy further does not teach:

- i. a plurality of gas inlet extensions that are integral to the bottom wall such that the gas inlets protrude upwardly from the bottom wall, as amended by claim 3
- ii. a plurality of gas inlet extensions that are integral to the body such that the gas inlets protrude upward from the body, as claimed by claim 9
- iii. Tracy does not teach that the injecting and discharging holes are upwardly protruded from the bottom part of the body (20; Figure 3; column 2, lines 55 - column 3, line 9), as claimed by claim 14.

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Umotoy teaches a gas (116, 118; Figure 1) distribution apparatus (Figure 1; column , line 3 – column 4, line 13) for supplying gasses (116, 118; Figure 1) into a semiconductor wafer processing chamber (100; Figure 1).

Specifically, Umotoy teaches his body (130; Figure 9) has a bottom wall (148; Figure 9) and a plurality of gas inlets (204, 206, 210; Figure 9) that perforate the bottom wall as is claimed in claim 1. Further, Umotoy teaches:

- iv. The apparatus, as defined in claim 1, wherein the body (130; Figure 9) additionally comprises a plurality of gas inlet extensions (200; Figure 5) that are integral to the bottom wall (148) such that the gas inlets protrude upwardly from the bottom wall, as claimed by claim 3
- v. The apparatus, as defined in claim 7, wherein the body (130; Figure 1) additionally comprises a plurality of gas inlet extensions (200; Figure 5) that are integral to the body such that the gas inlets (204, 206, 210; Figure 9) protrude upward from the body (130; Figure 1), as claimed by claim 9, 14

It would have been obvious to one of ordinary skill in the art at the time the invention was made to make Tracy's injection plate (12; Figure 3; column 2, lines 55-62) integral with exterior grooves (68, 70, 72; Figure 3; column 3, lines 20-30) and add Umotoy's gas distribution body along Tracy's slots 42, 44, 46, and 48 thereby providing a plurality of gas inlet extensions that are integral to Tracy's bottom wall such that Tracy's gas inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26) protrude upwardly from the bottom wall as taught by Umotoy.

Motivation to make Tracy's injection plate (12; Figure 3; column 2, lines 55-62) integral with exterior grooves (68, 70, 72; Figure 3; column 3, lines 20-30) and add Umotoy's gas distribution

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body along Tracy's slots 42, 44, 46, and 48 thereby providing a plurality of gas inlet extensions that are integral to Tracy's bottom wall such that Tracy's gas inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26) protrude upwardly from the bottom wall as taught by Umotoy is to provide even distribution to the process region as taught by Umotoy (column 1, lines 35-45) and to deliver plural unmixed gasses to the reactor chamber as taught by Umotoy (column 2, lines 45-65). Further, it is well established that the duplication of parts is obvious (In re Harza , 274 F.2d 669, 124 USPQ 378 (CCPA 1960) MPEP 2144.04). Further, it is held obvious that the use of a one piece construction instead of the structure disclosed in [the prior art] would be merely a matter of obvious engineering choice. (MPEP2144.04 - In re Larson, 340 F.2d 965, 968, 144 USPQ 347,349 (CCPA 1965)).

Response to Arguments

4. Applicant's arguments filed May 20, 2004 have been fully considered but are not persuasive.

5. Applicant states:

“

Contrary to the plain meaning of the feature recited in claim 1, Tracy's alleged grooves 68, 70, 72 are actually circular plenums located entirely inside the boundary of the alleged injection plate 12 (FIG. 3; column 3, lines 22-25; emphasis added). Thus, Tracy does not teach the feature of an injection plate having grooves on an upper surface of the injection plate.

“

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The Examiner agrees, as stated in the above rejections, with Applicant's position that Tracy's grooves (68, 70, 72; Figure 3; column 3, lines 20-30) are indeed located within Tracy's injection plate (12; Figure 3; column 2, lines 55-62). However, the Examiner believes that there is sufficient teaching in Tracy to provide motivation for relocating/extending Tracy's grooves (68, 70, 72; Figure 3; column 3, lines 20-30) such that they are located on Tracy's upper exterior surface for gas pressure/flow optimization (column 1; lines 55-68) – See lower groove position in Tracy's Figure 3.

Applicant states:

“

It is alleged that Tracy teaches a body (20, FIG. 3) having a bottom wall and a plurality of gas inlets (50, 52, 54, 56, 58, 60). To the contrary, Tracy teaches that the support plate 20 has only one gas inlet 40 from the source 22 (FIG. 3; column 3, lines 10-13; emphasis added). The alleged plurality of gas inlets are actually capillary tubes 50, 52, 54, 56, 58, 60, 62, 64, 66, 68 that form part of the electrode 12 (FIGs. 2 and 3; column 3, lines 19-22).

“

In response, the Examiner remains convinced that Tracy teaches a body (20, FIG. 3) having a bottom wall and a plurality of gas inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26) used to distribute process gas as taught by Applicant.

Applicant states:

“

In other words, contrary to the features recited in claim 1, the alleged gas inlets 50, 52, ..., 66, 68 are not part of the alleged body 20.

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“

The Examiner disagrees. Tracy clearly shows his gas inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26) are attached to, and are therefore part of, Tracy's body (20; Figure 3; column 2, lines 55 - column 3, line 9).

Applicant states:

“

Thus, Umotoy's faceplate 130 may correspond to the recited injection plate, but it does not correspond to the recited body.

“

In response, the Examiner's rejection is based upon "...add Umotoy's gas distribution body along Tracy's slots 42, 44, 46, and 48 thereby providing a plurality of gas inlet extensions that are integral to Tracy's bottom wall such that Tracy's gas inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26) protrude upwardly from the bottom wall as taught by Umotoy". Further, it is understood, per the above cited rejections, that the closest prior art to Applicant's "gas distribution body" is identically Tracy et al (USPat. 4,612,077):

“

a body (20; Figure 3; column 2, lines 55 - column 3, line 9) having a bottom wall and a plurality of gas (22; Figure 1) inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26) extending through the bottom wall; and an injection plate (12; Figure 3; column 2, lines 55-62), attached by being screwed to the bottom surface of the body's (20; Figure 3; column 2, lines 55 - column 3, line 9) bottom wall, the injection plate (12; Figure 3; column 2, lines 55-62) having grooves (68, 70, 72; Figure 3; column 3, lines 20-30) on an upper surface of the injection plate that connect

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the gas (22; Figure 1) inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26), the injection plate also having injection holes (34, 36, 38; Figure 2, 3; column 3, lines 5-10) that perforate the injection plate at predetermined intervals (radial distances of 28, 30, 32, and 27; Figures 2,3) throughout the grooves, - claim 1

“

Applicant states:

“

Umotoy's faceplate 130 has no provision for the circulation of coolant (column 5, line 50 to column 6, line 18). Thus, replacing or modifying Tracy's cooling plate 20 with Umotoy's faceplate 130 would render Tracy unsatisfactory for its intended purpose, consequently there can be no suggestion or motivation to make the proposed modification.

“

In response, the Examiner refers Applicant to the specific citation of Tracy for teaching an external periphery of an upper portion of the body (20; Figure 3; column 2, lines 55 - column 3, line 9) is fastened to the chamber, as claimed by claim 4 – Figure 1 shows coolant pipes 20 and gas pipe (40; Figure 3) fixed both to the body and the chamber 16. The Examiner did not recite in any portion of his rejection that a modification of “Tracy's cooling plate 20 with Umotoy's faceplate 130” was necessary for the combination. To the contrary, the Examiner has simply stated that it would have been obvious ... to add Umotoy's gas distribution body along Tracy's slots 42, 44, 46, and 48 thereby providing a plurality of gas inlet extensions that are integral to Tracy's bottom wall such that Tracy's gas inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26) protrude upwardly from the bottom wall as taught by Umotoy. The modification of

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adding Umotoy's gas distribution body along Tracy's slots 42, 44, 46, and 48 would not, as Applicant suggests "render Tracy unsatisfactory for its intended purpose, consequently there can be no suggestion or motivation to make the proposed modification." In fact the combination is supported by motivation found in the prior art – "is to provide even distribution to the process region as taught by Umotoy (column 1, lines 35-45) and to deliver plural unmixed gasses to the reactor chamber as taught by Umotoy (column 2, lines 45-65).".

Applicant's arguments with respect to the integrality of Tracy's components is addressed above in the body of the claim rejections.

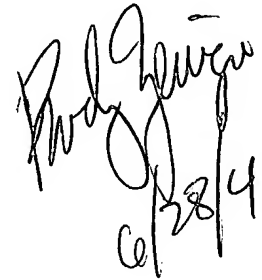
Concerning Applicant's position that "Tracy's slit openings 34, 36, 38 exist because the injection plate 12 is NOT formed of a single, integral unit (FIG 3; column 3, lines 7-9; emphasis added).", the Examiner disagrees. The formation of Tracy's slit openings 34, 36, 38 in a one piece structure would not be obstructed from transmitting Tracy's process gases because Tracy's inlets (50, 52, 54, 56, 58, 60; Figure 3; column 3, lines 19-26) convey Tracy's process gases through a monolithic injection plate (12; Figure 3; column 2, lines 55-62) still having the slit openings and plenums 68, 70, and 72.

Conclusion

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272.1442. The examiner can normally be reached on a Monday through Thursday schedule from 8am through 7pm. The official fax phone number for the 1763 art unit is (703) 872-9306. Any Inquiry of a general nature or relating to the status of this application or proceeding should be

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directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Gregory L. Mills, at (571) 272-1439.



Handwritten signature of Gregory L. Mills, dated 6/28/4.